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PREVENTION OPPORTUNITIES UNDER THE BIG SKY

TETANUS: PRIMARY PREVENTION, BEST; SECONDARY PREVENTION, SOMETIMES NEEDED

Tetanus is an entirely preventable disease. It is caused by a toxin produced by the bacteria *Clostridium tetani*. Persons who are up-to-date with tetanus immunization (including newborns whose mothers are immunized) are not susceptible to this toxin. However, persons who are not currently immunized are at risk of death if exposed to the toxin. This issue of *Montana Public Health* describes prevention steps necessary to eliminate tetanus in Montana.

The organism and the disease *C. tetani* is sensitive to heat and cannot survive in the presence of oxygen. However, *C. tetani* spores are very resistant to heat and to many antiseptics. These spores are widely distributed in soil and in the feces of many animals. *C. tetani* produces two exotoxins one of which, tetanospasmin, is one of the most potent neurotoxins known.

C. tetani spores usually enter human bodies through a wound. Then, in anaerobic conditions, the spores germinate and produce toxins. In persons who are not immune, tetanospasmin interferes with the release of neurotransmitters. The resulting unopposed muscle contraction, spasm and sometimes seizures is life threatening. Once these symptoms occur the risk of death is substantial.[1]

The incubation period varies from 3 to 21 days, usually about 8 days. In general, the further the wound (injury site) is from the central nervous system, the longer the incubation period.

Tetanus in the U.S. and in Montana There are no laboratory findings specific to tetanus; the diagnosis is entirely based on clinical findings. In the late 1940's tetanus toxoid became a routine childhood immunization, and the disease became nationally notifiable. At that time 500 to 600 cases were reported per year, by the 1970's 50 to 100 cases were being reported annually, and in 2006 only 41 cases were reported. In Montana, the most recent reported case of tetanus in an adult was reported in 2007, and a case of neonatal tetanus was reported in 1998. The last death attributed to tetanus in Montana occurred in 1961.

In the U.S. tetanus is primarily a disease in older adults. From 1980 to 2000, 70% of cases reported in the U.S. were in persons aged ≥ 40. Since 1996, however, more than 40% of cases were in persons <40. Of the 15 cases of tetanus in persons <15 years of age from 1992-2000, 12 (80%) were in children whose parents had philosophic or religious objection to vaccination.[2]

Essentially all reported cases of tetanus in adults occur in persons who have either never been vaccinated or who completed a primary series of vaccination but have not had a booster dose for more than ten years.

Primary prevention: vaccinate Tetanus toxoid was first produced in 1924. Use in World War II decreased the rate of tetanus in the armed services by more than 20-fold compared to the rate in World War I. This vaccine works, and with rare exception everyone in Montana should be currently immunized.

A complete primary vaccination with tetanus vaccine provides long-lasting protection. (see www.immunization.mt.gov for a detailed description of childhood vaccination recommendations, including school entry requirements). After complete childhood tetanus vaccination, persons should receive booster vaccination with a tetanus-toxoid containing vaccine at least every 10 years. Ideally, a combination vaccine (Td or Tdap) is used.

When a person has a clean or minor wound, a booster dose of tetanus vaccine is recommended if the person has not received a dose within 10 years. For all other wounds, a booster dose should be given if the patient has not received tetanus vaccine during the preceding 5 years.[3]

KEEP IMMUNIZATIONS UP-TO-DATE

Secondary prevention: antitoxin All wounds should be cleaned and foreign material removed. Clinicians should confirm the tetanus vaccine status of the patient and provide a tetanus booster as described above. The Advisory Committee on Immunization Practices (ACIP) recommends that persons without a complete primary tetanus vaccine series who have a tetanus-prone (puncture, dirty or extensive) wound routinely receive passive immunization as well as a booster dose of tetanus vaccine.[3] Passive immunization is provided with tetanus immune globulin (TIG). The TIG prophylactic dose that is recommended currently for wound care is 250 units for adult and pediatric patients.[4] In circumstances where TIG is indicated but not available, intravenous immune globulin may be substituted. Post exposure prophylaxis with antimicrobials is not recommended.

During the first week of August, 2008 Montana hospitals were surveyed to determine availability of TIG. Fifty of the 61 hospitals (82%) responded; 27 of the 50 (55%) reported at least one dose of TIG available (range 1-10; median 1.5).

Sharing arrangements among hospitals make TIG available to some hospitals that do not maintain on-site supply. Clinicians who wish to confirm availability of TIG at facilities where they practice should consult the facility's pharmacy.

Recommendations for prevention of tetanus

1. Vaccinate: provide primary series and regular booster does as recommended by ACIP[1]

2. Wound care: if person has tetanus-prone wound, provide passive immunization as well as updating vaccination (to patients who do not have known contraindication to tetanus toxoid)

   A. Clean, minor wound
      - wound care and debridement
      - age appropriate tetanus vaccine

   B. Tetanus-prone wound: including puncture of penetrating wounds; avulsions, burns or other non-intact skin contaminations by soil, feces
      - wound care and debridement
      - if patient has not had primary vaccine series and booster within past 5 years, provide TIG and tetanus vaccine (separate syringes, separate sites)

For more information, contact the Communicable Disease Epidemiology Section 406-444-0273 or the DPHHS Immunization Program, 406-444-5580.

References:
1. CDC. Preventing tetanus, diphtheria and pertussis among adults: use of tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccines: recommendations of ACIP, supported by the Health Care Infection Control Practices Advisory Committee (HICPAC), for use of Tdap among health-care personnel. MMWR 2006;55(No. RR-17).
2. Fair E, et al. Philosophic objection to vaccination as a risk factor for tetanus among children younger than 15 years. Pediatrics 2002;109:E2.
3. CDC. Diphtheria, tetanus, and pertussis: recommendations for vaccine use and other preventive measures: recommendations of the ACIP. MMWR 1991; 40(No. RR-10).
4. CDC. Recommendations for post exposure interventions to prevent infection with hepatitis B virus, hepatitis C virus, or HIV, and tetanus in persons wounded during bombings and similar mass-casualty events – United States, 2008: recommendations of the CDC. MMWR 2008; 57(No. RR-6).

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